

Kinetic energy climatology of anisotropic oceanic features

Josué Martínez-Moreno¹, Andrew McC. Hogg¹, and Matthew England²

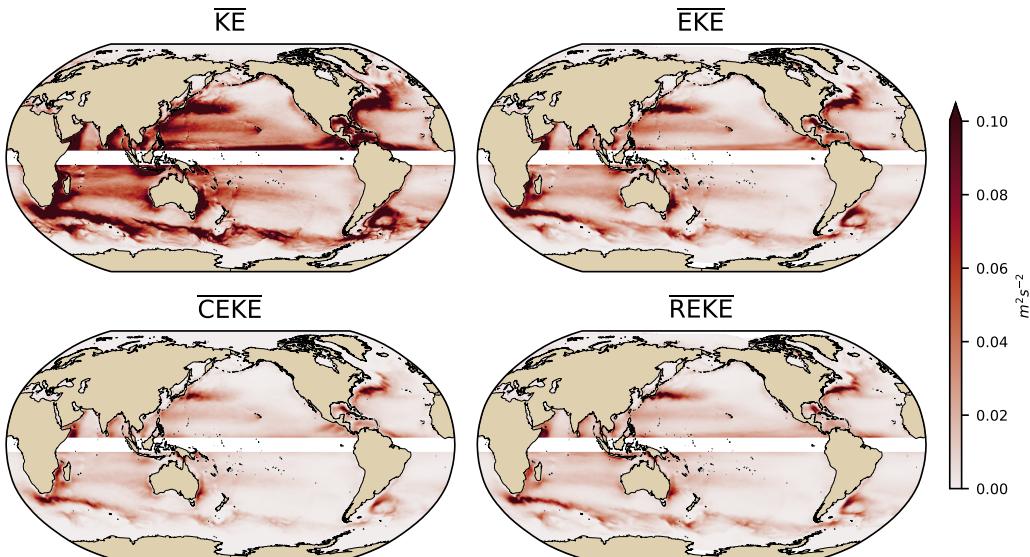
¹Research School of Earth Science and ARC Center of Excellence for Climate Extremes, Australian National University, Canberra, Australia

²Climate Change Research Centre (CCRC), UNSW Australia, Sydney NSW, Australia

Key Points:

- Kinetic energy climatology reveals a surprising heterogeneity in the global ocean.
- Transient kinetic energy show significant increasing trends over large areas of the Southern Ocean and the Northern Hemisphere.
- Regional kinetic energy climatology strongly depends to the region dominant oceanic process.

Corresponding author: Josué Martínez-Moreno, josue.martinezmoreno@anu.edu.au

**Figure 1.** Caption

Abstract

Ocean currents

Plain summary

1 Introduction

Ocean currents are highly anisotropic and include coherent vortices and meandering jets. While coherent vortices (recirculating currents) are approximated as ellipses with axes smaller than the Rossby radius of deformation (R_D), meandering jets are narrow but elongated currents. The anisotropic nature of these features translates in ...

2 Methods

3 Results

3.1 Climatology

- Figure 1 shows regions with high values of Kinetic Energy at the Western Boundary Currents, ACC, and ocean gyres.
- \overline{EKE} Explains 70% of \overline{KE} , while \overline{CEKE} is 40% of \overline{EKE} and \overline{REKE} is 60% of \overline{EKE}

- Maps show that \overline{KE} , \overline{EKE} , \overline{CEKE} , and \overline{REKE} are dominated by the western boundary currents, the Antarctic Circumpolar Current (ACC).

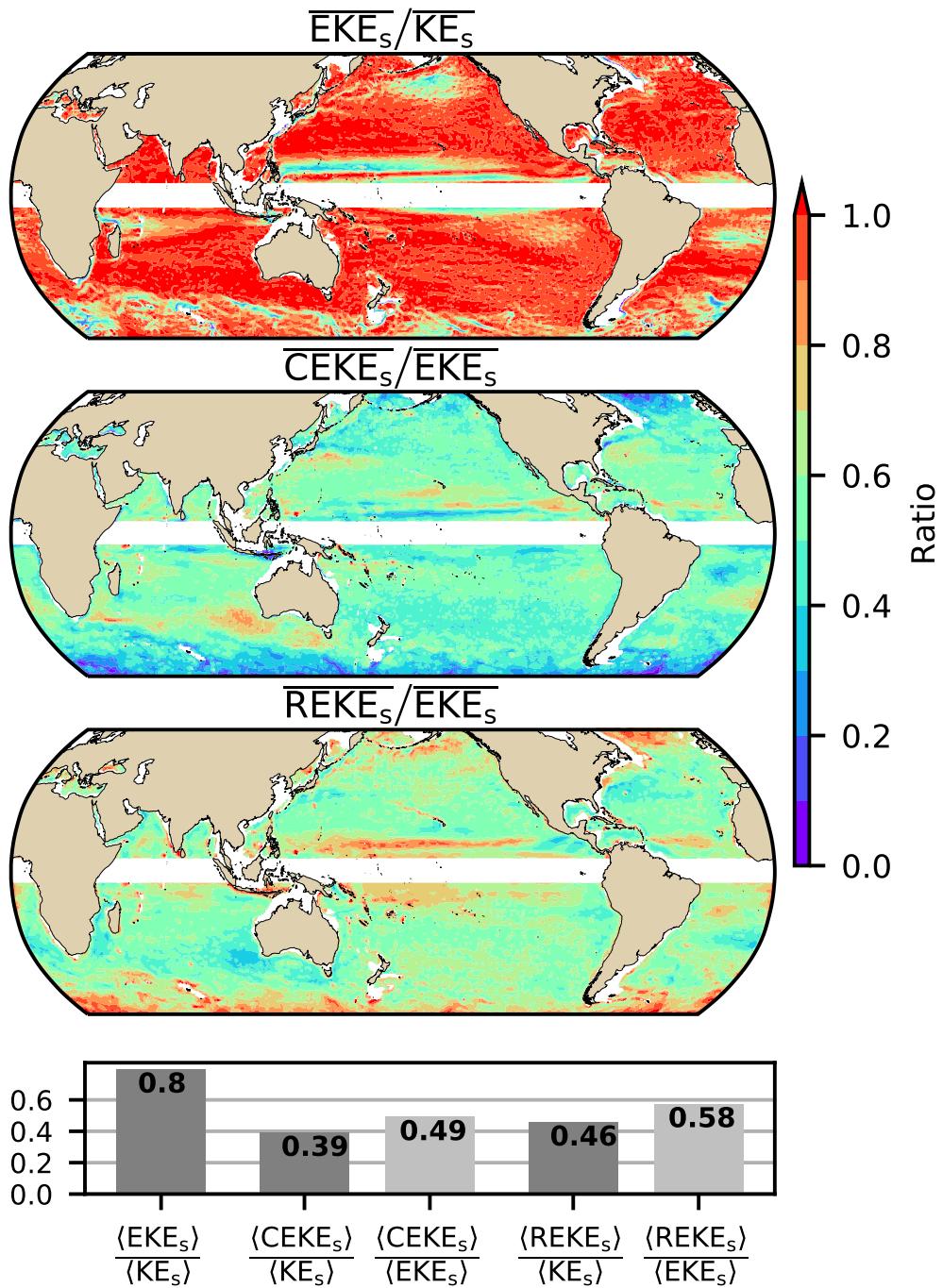
•

3.2 Seasonality

4 Summary and Conclusions

Acknowledgments

References

**Figure 2.** Ratios of the kinetic energy components. a)

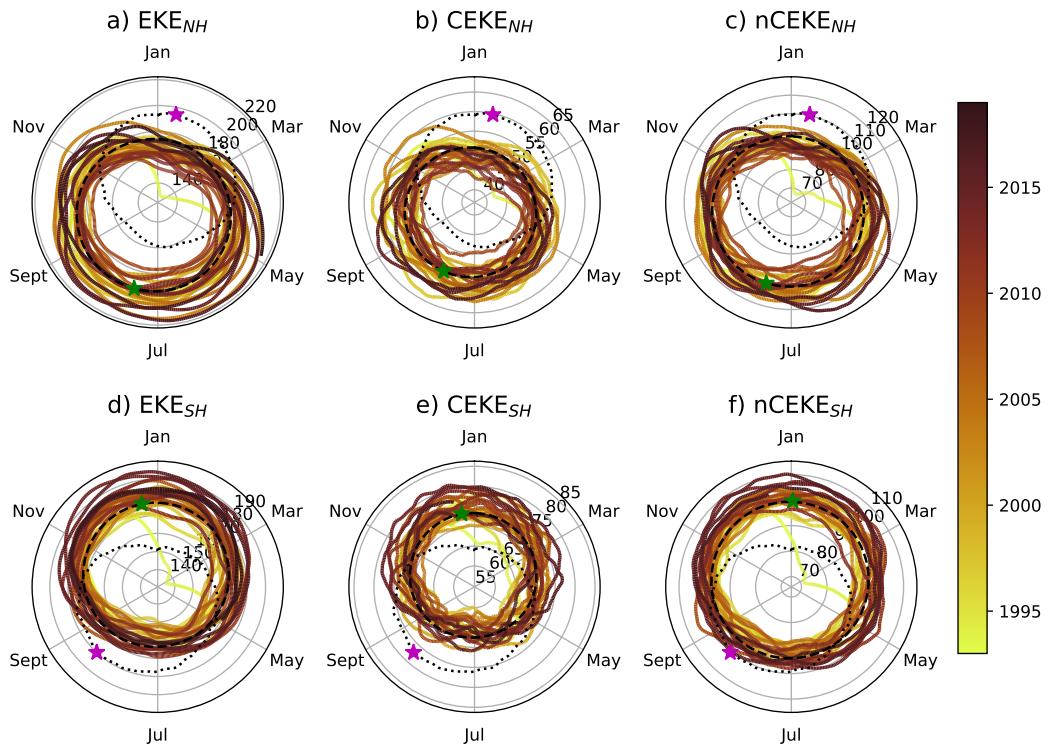


Figure 3. Dashed lines correspond to the seasonal climatology of the fields. Dotted lines show the climatology of the wind magnitude. The green and magenta stars show the maximum of the seasonal cycle for the kinetic energy components and the wind magnitude, respectively.